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STANDARD OPERATING PROCEDURE

JOINT OPERATION OF S-50 AND X-25 POWER PLANT

PLANT
CENTRO
REC. 633833
X-REF.
X-REF.

The operating procedure as outlined herein is currently in effect and governs the operations, as they affect one another, of the S-50 Plant and the K-25 Power Plant.

1. Supply and Control of Services Exchanged Between 3-50 and K-25 Power Plant.

1. High Pressure Steam.

KZ-6597

a. Superheated steam at power plant steam header pressure and temperature shall be supplied to the S-50 plant through three 10-inch lines. The pressure and temperature of the steam supplied to the S-50 plant shall be under the control of the K-25 power plant operating personnel and shall be kept as nearly constant and free from fluctuations as practical. Generally, steam at pressure and temperature conditions suitable for use in the power plant steam turbines shall be acceptable for use by S-50.

b. Except as limited by the provisions of Paragraph V-1 hereof, the flow rate of high pressure steam delivered to the S-50 plant shall be under the control of S-50 operating personnel and dependent on the S-50 production schedule and/or equipment available for service. S-50 operating personnel shall exert their best efforts to keep down undue fluctuations in the flow rate and shall notify and obtain the concurrence of K-25 power plant operating personnel prior to cutting in or out equipment which will result in a change in the steam flow rate. Motor operated valves in the three steam supply lines, closing-controls of which are in both plants, shall not be closed except in the direst emergencies and after having given the other plant as much advance warning as possible of such action.

2. High Pressure Condensate.

a. High pressure condensate shall be returned to the power plant through one 12-inch line at a pressure at the 5-50 board of approximately 915 p.s.i. and a temperature of 535 (200 to 215 deg F) on superheated steam losses unintentional loss through leaks, and intentional wastage as provided in Paragraph 4-c hereof, all water entering 5-50 as high pressure steam shall be returned as high pressure condensate at 5-50 the high pressure, high temperature desuperheating pump at 5-50 is not operated, the high pressure condensate includes all the water entering 5-50 as desuperheating water.

b. Pressure of the high pressure condensate shall be controlled and held as nearly constant as possible by power plant operating personnel. S-50 operating personnel shall designate by telephone the exact pressure to be maintained to conform to friction losses and process requirements. The handling of high pressure condensate after its return to the power plant is influenced by certain equipment which, under certain conditions, may be the limiting factor governing the quantity of steam taken by S-50.

This document has been approved for release
to the public by: DR16/CAW Date 5/1/96
Technical Information Officer
Oak Ridge K-25 Site

Carbide and Carbon Chemicals Corporation, Operating Contractor for the U.S. Atomic Energy Commission.

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3. Low Pressure Steam.

a. Low pressure steam shall be supplied to S-50 through an 8-inch line at a pressure of approximately 100 p.s.i. from the power plant building heating service system. The quantity of steam thus supplied is not metered but shall be supplied in such quantities as necessary to keep the pressure reasonably constant.

b. A pressure reducing station is installed in the S-50 plant for reducing high pressure steam to conditions suitable for use in lieu of that described in Paragraph a above.

4. Low Pressure Condensate.

a. Low pressure condensate shall be classified by S-50 as (1) that not coming in contact with materials which might contaminate it, and (2) that subject to possible contamination, with the two classes collected in separate tanks.

b. The tank in which the non-contaminated condensate is collected shall be served by a float-controlled condensate return pump which will return the condensate to the power plant flash tanks through a 4-inch line.

c. The tank in which the contamination-susceptible condensate is collected is equipped with a condensate pump which shall be manually controlled. A sample shall be taken from each tankfull of water and tested for contamination before emptying. If the sample shows contamination the condensate shall be wasted to the sewer, otherwise it shall be pumped to the power plant as in Paragraph b above.

d. Equipment is on order for making tests on the contamination-susceptible condensate by means of a conductivity cell and automatically wasting or returning the water to the power plant, as the tests indicate. This equipment will be installed as soon as received and the procedure of Paragraph c above will be superseded.

5. Desuperheating Water.

a. Subject to changes as set forth in Paragraph b below, boiler feed water at a pressure of approximately 1800 p.s.i. and a temperature of 300° F. to 350° F. shall be supplied from the boiler feed header to S-50 through a 2½-inch line for desuperheating the high pressure steam. When only this method of desuperheating is being used, the quantity of water supplied varies directly as the flow of high pressure steam, being approximately 30% of the latter. Flow of desuperheating water shall be under the control of S-50 operating personnel.

b. It is ultimately planned to desuperheat by pumping part of the high pressure condensate into the incoming high pressure steam, this operation being accomplished entirely within the S-50 plant. To date, pumping equipment for this service has been unreliable but after these difficulties have been overcome this method of operation will supersede that of Paragraph a above, making the furnishing of desuperheating water no longer necessary.

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6. Pump Gland Seal Water.

a. Distilled water at gravity head and ambient air temperature shall be supplied from the power plant reserve feed water tank through a 6-inch line to S-50 for use in sealing the glands of the hot condensate desuperheating pump described in Paragraph 5-b above. This water is practically all returned to the condensate system and the quantity used depends on the use of the hot condensate pumps.

7. Cooling Water.

a. Cooling water for the two plants is taken from the river and forced into the cooling water distributing system by means of any combination of three pumps connected to operate in parallel. These pumps shall be operated by personnel of the power plant who, by controlling the number of pumps operating simultaneously, have rough control over the distributing system pressure. The pressure to S-50 may also be regulated by manipulation of a 42-inch valve which shall be under the control of S-50 operating personnel. This valve is now manually operated but will be put under remotely-controlled motor operation in the near future.

b. Under ordinary operating conditions, any cooling water pressure which is satisfactory for power plant operation shall be satisfactory for the requirements of S-50; however, the quantity of water taken by S-50 shall be kept at the minimum consistent with the requirements.

c. It is possible that after the two plants are in full operation, and especially in the event of outage of a pump, the supply of cooling water will be inadequate for the requirements of the two plants. When such a condition obtains, each plant shall reduce its consumption of cooling water to a minimum, with coordination of effort accomplished by telephone. If the quantity of cooling water available is insufficient to fill the minimum requirements of the two plants, then, upon orders of power plant watch engineer, the S-50 operation shall be curtailed in proportion to the quantity yet available after the minimum requirements of the power plant are supplied.

II. Feed Water Supply.

1. The facilities at the present time installed in the power plant for the evaporation and storage of reserves of boiler feed water are very limited. Operation of the evaporators at full capacity involves the operation of certain steam-consuming equipment in the power plant. When condensate losses are so high that a high rate of evaporation is required and the steam generating capacity is not sufficient to supply all equipment incident to evaporation as well as the steam load desired by S-50, then the steam taken by S-50 shall be at the request of the Power Plant Watch Engineer, curtailed to permit a safe rate of evaporation.

2. In the event of a break in the condensate return line or other failure which will result in eventual shut down because of loss of condensate, those items of equipment which can not be operated when the break is isolated shall

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be cut out of service as soon as practical or as soon as the exigencies of the situation demands.

III. Interchange of Information Between Operating Personnel of the Two Plants.

1. In order to promote a more clear understanding on the part of each key operator of the effects in the other plant of operational changes in his plant and to promote coordination between the two plants, key operating personnel of each plant shall be given limited access to the other plant. This shall be accomplished by the issuance of the proper permanent passes or badges with the understanding on the part of each man that he is to be accompanied by the watch engineer of the visited plant when making use of the pass and is to visit only such parts of the plant as concerns operation of his own plant.

2. Listed below are operating personnel who have been issued badges as described in Paragraph 1 above:

a. Fercleve Corporation employees issued power plant badges:

Roberts, J. M., Asst. Plant Mgr.
Plott, J. H., Steam Engineer.
Anderson, M. F., Watch Engineer.
Greer, H. W., Watch Engineer.
Casper, S. B., Electrical Foreman.
Bullock, J. W., Electrician.
Curry, O. A., Electrician.
Ketner, L. D., Electrician.
McNair, R. M., Electrician.
Perkins, J. T., Electrician.
Evans, T. J., Construction Officer.

b. Carbide and Carbon Chemicals Corporation employees issued S-50 badges:

Riley, D. H., Asst. Supt., Steam.
Leslie, J. D., Sta. Watch Engr., Steam.
Mears, H. R., Sta. Watch Engr., Steam.
Egan, B. C., Sta. Watch Engr., Steam.
Reel, G. W., Sta. Watch Engr., Steam.
Branum, P. V., Electrical Maintenance Foreman.
Haynes, T. M., Electrical Test Engineer.
Heaviland, L., Electrician, Test.
Hoch, O. J., Electrician, Test.
Hunan, G., Electrician, Maintenance.
Surt, J. M., Electrician, Maintenance.
Roberts, E., Electrician, Watch.
Smith, L. S., Electrician, Maintenance.
Beard, C. W., Power Plant Officer.

IV. Inter-Plant Communications System.

1. Communication facilities between the two plants consists of a direct

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line between the S-50 steam control office and the power plant turbine room as well as telephones through the K-25 and S-50 exchanges. Incoming calls to the power plant over the direct line light three signal lamps located near the condensate return control stations. In addition to the regular telephone on his desk, the power plant watch engineer may be summoned on the house telephone system by first calling the power plant control room. The S-50 steam operator may be called by regular telephone through the S-50 exchange; however, steps are being taken to get a direct connection to the K-25 exchange for this service.

2. Telephone calls shall be logged at each plant, with the log showing the time of the call, the action requested or information conveyed, and the person making the call.

3. Where the call is of a very routine nature the required action thereon shall usually be taken by the person who receives the call. In the event the call involves change of operating conditions or important action involving the making of a decision the watch engineer shall be brought to the telephone before any action is initiated.

V. Operating Agreements.

1. Preplanning Operating Schedules.

a. Long-range operating schedules based on production schedules desired by higher authority and the physical considerations at the two plants shall be worked out by the supervisory personnel of the two plants. In the making of these schedules the timing of scheduled outages on major items of equipment shall be made such as to permit following the production schedule as closely as is advisable for safe operation. When an outage of equipment in one plant which will result in a curtailment of production is foreseeable and imminent, the other plant shall be given as much notice as possible thereof in order that repair and maintenance work may be done to best advantage on the equipment thus forced out of service.

b. The expected rate of operation for each 24-hour period shall also be scheduled and agreed to in advance to assure that the program anticipated by one plant does not exceed the ability of the other to supply the services involved. A schedule of expected steam demands of the S-50 plant for each 24-hour midnight to midnight period shall be submitted to the power plant at least 12 hours before the beginning of the period covered. In the event that this quantity of steam can be supplied, the hot condensate resulting can be handled, and all other conditions involved can be met, the power plant superintendent shall concur and return a signed copy of the schedule to S-50. If the quantity of steam requested on the schedule would require operating conditions which can not be met by the power plant, then this quantity shall be revised to the maximum figure which can be handled safely. Copy of the revised schedule shall be signed and returned to S-50 and the steam consumption shall be kept at or below the approved scheduled rate for that day.

2. Necessity for Uninterrupted Service.

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a. It is recognized by the personnel of each plant that the safe, continued operation of the other plant is of utmost importance. The effort shall therefore be made to provide as uniform operating conditions as possible, to give as much notice as possible prior to making emergency operational changes which effects the other plant, and to cooperate to the fullest extent in the handling of emergencies arising in the other plant.

3. Policy Regarding Quantity of Services.

a. Every effort consistent with safe operating practices shall be made by K-25 power plant to supply the full demands of S-50. It is understood by the operators of both plants that the K-25 process will receive priority on the output of the power plant in all cases where, by reason of overhaul or emergency conditions, the plant capacity is less than the combined requirements of K-25 and S-50. Full advantage will be taken of the energy available from the T.V.A. tie-line in order to make the greatest amount of steam possible available to S-50.

